MATH 250 : Ordinary Differential Equations
Course Syllabus - Spring 2022

Prerequisite: Math 141 or Math 141H.

Textbook: Elementary Differential Equations and Boundary-Value Problems,
Boyce, DiPrima, Meade, 11E.

You only need the textbook, **you do not need the WileyPlus or WileyLegacy Packages**.
It is available at the student bookstore in looseleaf hard copy or ebook:

Elementary Differential Equations and BoundaryValue Problems, Eleventh Edition Loose-Leaf
Report Category: Binder Ready Version
Division: Global Education
ISBN: 978-1-119-44376-6 (1-119-44376-8)

Elementary Differential Equations and Boundary Value Problems, Eleventh Edition Enhanced
EPUB Student Package
Report Category: Wiley E-Text Student Pack
Division: Global Education
ISBN: 978-1-119-38165-5 (1-119-38165-7)

It can also be **rented** or bought directly from Wiley.

Sections covered from the book:

Ch.1: 1.1, 1.2, 1.3   **Ch.6:** 6.1, 6.2, 6.3, 6.4, 6.5
Ch.2: 2.1, 2.2, 2.4, 2.5   **Ch.7:** 7.1, 7.2, 7.4, 7.5, 7.6 , 7.8
Ch.3: 3.1, 3.2, 3.3, 3.4, 3.5, 3.7   **Ch.9:** 9.1, 9.2, 9.3

Week	Sections covered in Lecture	Remarks
Jan. 10	1.1 - 1.3	*Review Integration*
Jan. 17	2.1	Jan. 17 = MLK Day
Jan. 24	2.2 - 2.5	*Review Algebra, Partial Fractions*
Jan. 31	2.5 - 3.2	
Feb. 7	3.3 - 3.5	
Feb. 14	3.5, Review	Feb. 16 = **Exam 1**
Feb. 21	3.7	*Review Arctan*
Feb. 28	3.7 - 6.2	*Review Partial Fractions*
March 7	No class	*Practice 3.7 & 6.2*
March 14	6.2 - 6.4	
March 21	6.5, Review	March 23 = **Exam 2**
March 28	7.1 - 7.4	
April 4	7.5 - 7.8	April 8 = Late Drop
April 11	9.1	
April 18	9.2 - 9.3	
April 25	9.3, Review	
May 2	Finals Week	Good Luck!

Advice for Successful Learning:

There is no substitute for **PRACTICE**. You should attempt to solve each example done in class, and view the solution for help or to check your work. Class examples and homework problems serve as your primary source of learning.

Beyond that it may take multiple attempts at understanding the material. Ask questions in class and office hours, work with classmates. In an online setting or if viewing a recorded lecture, you can participate by pausing the video during a worked example, and try solving it yourself. Take notes during the video and post questions in the Canvas discussion.

Don't be deterred to persevere and put more hours into the course .... keep trying!

Course Goals
1. Classify an ordinary differential equation (ODE).
2. Solve low order ODE's and systems of ODE's.
3. Apply ODE's to models for linear oscillators and analyze the solution.

Course Topics
1. Classification of ODE's into linear, nonlinear, order, homogeneous or non.
2. Verification of solutions.
3. Use of initial conditions.
4. Determining the interval on which a solution is defined as a solution.
5. Finding constant solutions to an arbitrary ODE.
6. 1st order ODE's: "Existence and uniqueness" theorem for linear ODE's, determining the behavior of solutions to autonomous ODE's, solving explicitly for solutions to separable ODE's, computing integrating factors and solving linear ode's.
7. 2nd order linear ODE's: "Existence and uniqueness" theorem, superposition principle, fundamental sets of solutions and the Wronskian test, solving homogeneous ODE's with constant coefficientss, method of undetermined coefficients or "superposition approach" for solving non homogeneous with constant coefficients.
8. Application of 2nd order linear ODE's with constant coefficients to linear springs, solving to find the motion and analyzing specifics about the motion.
9. Laplace transforms of 2nd order linear constant coefficient ODEs, step functions, and Dirac delta functions.
10. Matrix review mostly for 2x2 and 2x1 matrices: addition, multiplication, scalar multiplication, determinants. Computing eigenvalues and eigenvectors.
11. Solving systems of 2 1st order linear homogeneous ODE's, non linear systems of ODE's. Linearization near critical points.

Grades: Grades will be assigned on a 500 point basis:

Exam 1	100 pts
Exam 2	100 pts
Final	150 pts
Quizzes	50 pts
Homework	100 pts

Your total points earned during the semester determine your course grade:

A :   455 - 500
A- :   445 - 454
B+:   425 - 444
B :   405 - 424
B- :   385 - 404
C+:   365 - 384
C :   330 - 364
D :   300 - 329
F :   0 - 299

Exams: There will be 2 Midterms and a Final. Exam Locations are found on the section syllabus:

Exam 1	February 16, 6:15 - 7:30 pm
Exam 1 Conflict	February 16, 4:50 - 6:05 pm
Exam 1 Makeup	February 21, 6:15 - 7:30 pm
Exam 2	March 23, 6:15 - 7:30 pm
Exam 2 Conflict	March 23, 4:50 - 6:05 pm
Exam 2 Makeup	March 28, 6:15 - 7:30 pm
Final	May 2 - May 6, exact date to be announced.

Homeworks, Quizzes: This is specific to each instructor, refer to your section syllabus.

University Mask Policy:

Penn State University requires everyone to wear a face mask in all university buildings, including classrooms, regardless of vaccination status. This is to protect your health and safety as well as the health and safety of your classmates, instructor, and the university community. Anyone attending class without a mask will be asked to put one on or leave. Instructors may end class if anyone present refuses to appropriately wear a mask for the duration of class. Students who refuse to wear masks appropriately may face disciplinary action for Code of Conduct violations. If you feel you cannot wear a mask during class, please speak with your adviser immediately about your options for altering your schedule.

Pandemic & Health:

The University has put several rules and guidelines in place to protect employees and students. But if you become sick, get medical attention. Reach out to your instructor if you become sick and need consideration for assignments and exams, we will try to work with you as best as possible.

You never need to divulge your personal health and medical information.

Counseling and Psychological Services:

The university offers a variety of confidential services to help you through difficult times, including individual and group counseling, crisis intervention, consultations, online chats, and mental health screenings.

Counseling and Psychological Services at University Park: CAPS

https://studentaffairs.psu.edu/counseling

814-863-0395

Educational Equity/ Report Bias: Penn State takes great pride to foster a diverse and inclusive environment for students, faculty, and staff. Acts of intolerance, discrimination, or harassment due to age, ancestry, color, disability, gender, gender identity, national origin, race, religious belief, sexual orientation, or veteran status are not tolerated and can be reported through Educational Equity via the Report Bias webpage (http://equity.psu.edu/reportbias/).

Student Disability Resources: Penn State welcomes students with disabilities into the University's educational programs. Every Penn State campus has an office for students with disabilities. Student Disability Resources (SDR) website provides contact information for every Penn State campus (http://equity.psu.edu/sdr/disability-coordinator). For further information, please visit Student Disability Resources website (http://equity.psu.edu/sdr/).

In order to receive consideration for reasonable accommodations, you must contact the appropriate disability services office at the campus where you are officially enrolled, participate in an intake interview, and provide documentation: See documentation guidelines (http://equity.psu.edu/sdr/guidelines). If the documentation supports your request for reasonable accommodations, your campus disability services office will provide you with an accommodation letter. Please share this letter with your instructors and discuss the accommodations with them as early as possible. You must follow this process for every semester that you request accommodations.

Academic Integrity Statement:

Each instructor of MATH 250 is **committed to academic integrity** and all University policies as well as Eberly College of Science policies are followed strictly. Cheating is antithetical to PSU values, here is a quote on the subject:

" Academic dishonesty includes, but is not limited to, cheating, ... facilitating acts of academic dishonesty by others, having unauthorized possession of examinations, submitting work of another person or work previously used without informing the instructor, or tampering with the work of other students ... A student charged with academic dishonesty will be given oral or written notice of the charge by the instructor. If the student believes he has been falsely accused, he should seek redress through informal discussions with the instructor, the department head, dean, or campus executive officer. If the instructor believes the infraction is sufficiently serious to warrant the referral of the case to Judicial Affairs, or if the instructor will award a final grade of F in the course because of the infraction, the student and instructor will be afforded formal due process procedures."

From *Policies and Rules, Student Guide to the University*, Policy 49-20. Please see the Eberly College Academic Integrity homepage for additional information and procedures.

Exam and quiz answers must be a product of your own thinking and work without the aid of online materials, notes, people, or books.

Course coordinator:

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